MITSUBISHI HEAVY INDUSTRIES, LTD.

Our Technologies, Your Tomorrow

R410A

# Eco·lution

## High Performance Air to Water Heat Pump

# Hydrolution HM

Air to Water Heat Pump

50Hz

11HM01E-A-0

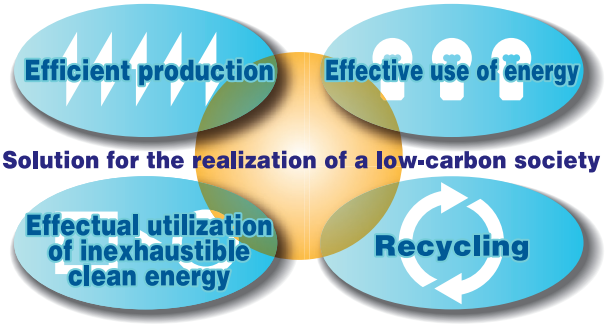
# Air to Water Heat Pump

Mitsubishi Heavy Industries has integration of high technology in a variety of areas and provides comprehensive solutions for realization of a low-carbon society.
Air to water heat pump is one of our products supported by our unrivaled technology to realize utmost energy savings, safety and assurance.

## Our realized contributions to global environment

Our contributions to a low-carbon society encompass the entire product life cycle from efficient production, effective use of energy, effectual utilization of inexhaustible clean energy and recycling. This is a part of our accomplishments through unique technological features.

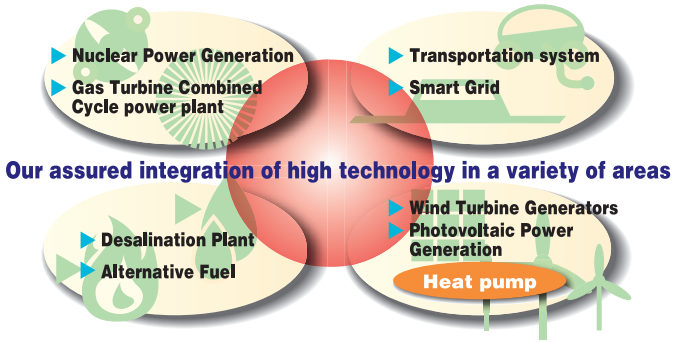
**Mitsubishi Heavy Industries provides total solutions to reduce environmental load in entire social infrastructure.**


Efficient production
Effective use of energy
Solution for the realization of a low-carbon society
Effectual utilization of inexhaustible clean energy
Recycling

## Assured integration of high technology in a variety of areas

Our product portfolio covering entire social infrastructure is supported by our proven high technology. We integrate proprietary technologies which have already demonstrated its significant capabilities in their own fields to augment its effects in our total solutions. Our air to water heat pump is an innovative system developed by such integration of high technology.

**Our assured integration of high technology is the mainstay of low-carbon society.**

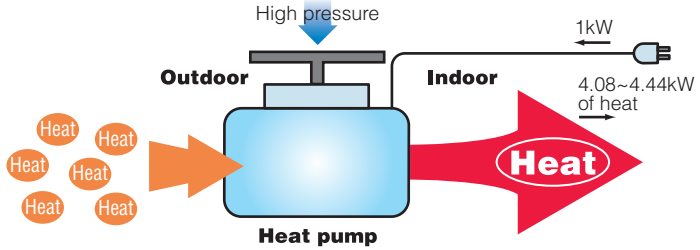



## Heat pump technology for low-carbon society

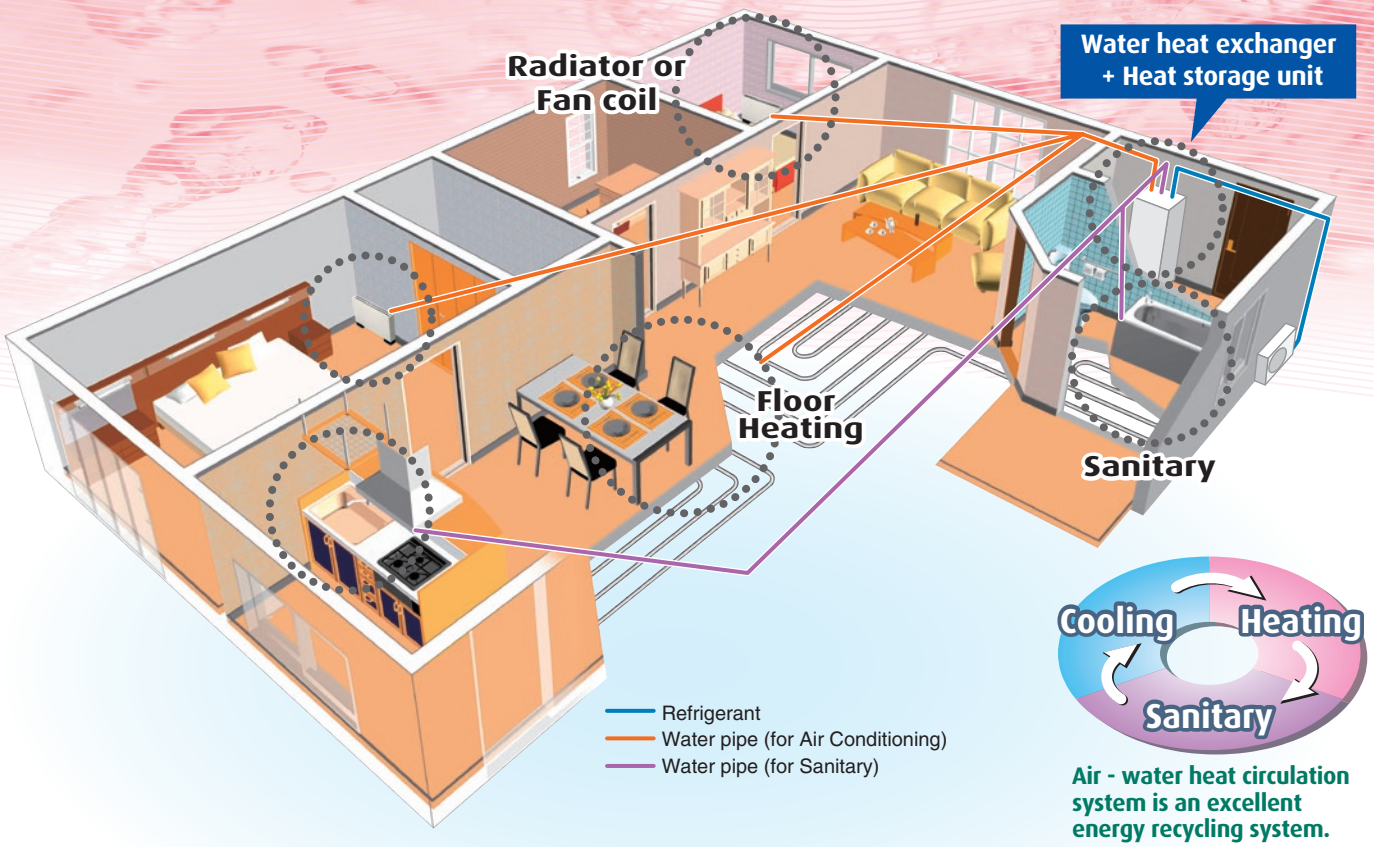
Air to water heat pump is a revolutionary energy recycling system which reduces environmental load by reusing heat energy produced in daily life.
This first-rate energy saving system has been developed by our exceptional technology.

**Saving running cost with use of heat pump technology**

Typically less than 1kW of output heat energy can be produced by conventional oil or gas boilers. Heat pump technology is capable of producing up to 4.44kW of heat energy from 1kW of energy input making the system 4.44 times more efficient than traditional means.



# Product Information





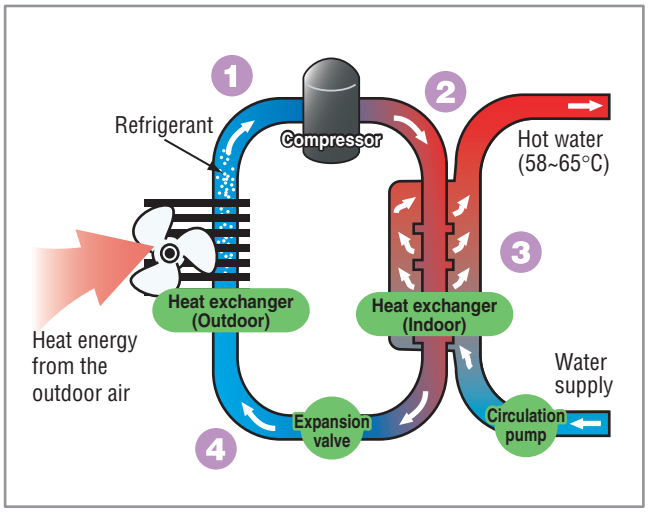


**Air - water heat circulation system is an excellent energy recycling system.**

Our Air to Water Heat Pump is a complete modern system for heating, cooling and producing hot sanitary water for houses, offering effective energy saving and reducing carbon dioxide emission. Our product is safe and economical with integrated hot water heater, immersion heater, circulating pump and climate system within the indoor unit.

The heat energy is retrieved from the outdoor air through the outdoor unit, and is transferred to the indoor unit by the medium of refrigerant circulated in closed piping system.
This eliminates the needs of bore holes and coils in the ground for conventional systems.

# Heat pump technology system




Our Air to Water Heat Pump is a system that can offer heating, hot sanitary water and cooling. The mechanism of heat pump during heating can be simplified as follows.

1. The outdoor unit retrieves the heat energy from the outdoor air (heat source) and increases its temperature through compressing process by compressor.
2. The hot refrigerant (now in gas state) is routed to Indoor unit.
3. The refrigerant releases the heating energy to water for further distribution in the climate system.
4. The refrigerant (now in liquid state) is routed back to the outdoor unit and this process is repeated.

By reversing the entire process for cooling, the refrigerant in this system retrieves the heat energy from water and releases it to outdoor air in accordance with heat pump theory.
the indoor unit determines when the outdoor unit is to run or not to run by using the collated data from the temperature sensor. In the event of extra heat demands, the indoor unit can utilize additional heat in the form of the immersion heater, or any connected external addition.

## 3HP, 3.5HP

Outdoor unit

FDCW71VNX-A

FDCW100VNX-A

Indoor unit

HMA100V1/V2
HMA100VM1

## 6HP

Outdoor unit

FDCW140VNX-A

Indoor unit

HMS140V1/V2

Tank unit

HT30

MT300

MT500

# Features

### • Energy saving

Optimum annual operation costs thanks to the inverter driven compressor.
The speed of the compressor is controlled according to the demand resulting in the industries highest COP level of 4.08~4.44* in heating operation.
(*: condition 2 on page 5)

### • Integrated design

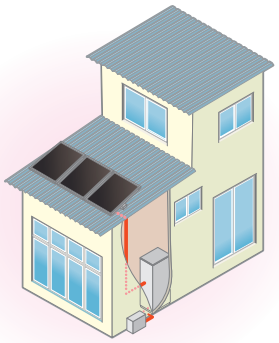
The compact size (600 x 650mm footprint) has been achieved by intergrating the hot water tank for sanitary water use together with the water heat exchanger within the indoor unit (HMA100V1/V2 and HMA100VM1 only). Electrical and piping work is simpler due to the intergrated design.

### • 65˚C hot water

Max temperature flow line is 65˚C with the use of an auxiliary electric heater (as standard) used for hot water back-up and to cope with irregular and excessive hot water demand.
(58°C with only use of compressor)

### • External heating

Possible to connect external heating sources including solar collectors. Refer to our installation manual for details.
(except HT30)



Combination with solar collectors

### • Drain pan heater

Condensate from the heat pump during heating operation (especially in cold regions) accumulates and freezes within the outdoor unit resulting in insufficient heating capacity or damage to the heat exchanger. Our units have a drain pan heater included as standard preventing condensate from freezing and protecting the heat exchanger in cold conditions.

### • Sterilization

Various sterilization temperature settings according to the requirements of each country.

### • Water supply pressure

Water supply pressure at showers and faucets to second and third floors will not drop.
By utilizing the direct incoming water supply and not using water from a storage tank water pressure and quality is maintained as well as the reduction in risk of legionella bacteria generation.
(If a third party water storage tank is used there will be a reduction of water pressure at showers and faucets when they are used at the same time.)

### • Silent mode

Silent mode function can reduce the sound level from the outdoor unit in the heating mode by reducing compressor and fan speed. ON/OFF timer operation can be set with a remote control.

# Specifications

## 3HP, 3.5HP, 6HP

| | | | 3HP | | 3.5HP | | 6HP |
|---|---|---|---|---|---|---|---|
| Indoor unit | | | HMA100V1<br>HMA100V2 | HMA100VM1 | HMA100V1<br>HMA100V2 | HMA100VM1 | HMS140V1<br>HMS140V2 |
| Outdoor unit | | | FDCW71VNX-A | | FDCW100VNX-A | | FDCW140VNX-A |
| Power source | | | 1 phase 230V 50Hz<br>3 phase 400V 50Hz | 3 phase 230V 50Hz | 1 phase 230V 50Hz<br>3 phase 400V 50Hz | 3 phase 230V 50Hz | 1 phase 230V 50Hz<br>3 phase 400V 50Hz |
| Heating Nominal capacity | condition 1 | kW | 8.0 (3.0-8.0) | | 9.0 (3.5-12.0) | | 16.5 (5.8-16.5) |
| | condition 2 | kW | 8.3 (2.0-8.3) | | 9.2 (3.5-10.5) | | 16.5 (4.2-17.2) |
| COP | condition 1 | | 3.33 | | 3.60 | | 3.31 |
| | condition 2 | | 4.08 | | 4.44 | | 4.20 |
| Cooling Nominal capacity | condition 1 | kW | 7.1 (2.0-7.1) | | 8.0 (3.0-9.0) | | – |
| | condition 2 | kW | 10.7 (2.7-10.7) | | 11.0 (3.3-12.0) | | 16.5 (5.2-16.5) |
| EER | condition 1 | | 2.68 | | 2.81 | | – |
| | condition 2 | | 3.35 | | 3.62 | | 3.59 |
| Tapping capacity | 12liter/min | liter | 270 | | 270 | | – |
| | 16liter/min | liter | 200 | | 200 | | – |
| Operation range (Ambient temperature) | | heating | -20-43 | | | | |
| | | cooling | 15-43 | | | | |
| Operation range (Water temperature) | | heating | 25-58 (65 with immersion heater) | | | | |
| | | cooling | 7-25 | | | | 18-25 |
| Max refrigerant pipe length | | m | 30 | | | | |
| Max height difference between IU and OU | | m | 7 | | | | |
| Indoor Unit | Height | mm | 1760 (+20-50mm, adjustable feet) | | | | 1004 |
| | Width | mm | 600 | | | | 513 |
| | Depth | mm | 650 | | | | 360 |
| | Weight (without water in the system) | kg | 140 | | | | 60 |
| | Immersion heater | | 9kW 4steps | | | | – |
| | Volume total | liter | 270 ±5% | | | | – |
| | Volume hot water coil | liter | 14 | | | | – |
| | Volume expansion vessel | liter | – | | | | 18 |
| | Dimensions, climate system pipe | mm | 22 | | | | 28 |
| | Dimensions, hot water pipe | mm | 22 | | | | – |
| | Water pipe connections | | Compression fittings | | | | |
| Outdoor Unit | Height | mm | 750 | | 845 | | 1300 |
| | Width | mm | 880 (+88 with valve cover) | | 970 | | 970 |
| | Depth | mm | 340 | | 370 (+80 with foot rail) | | 370 (+80 with foot rail) |
| | Weight | kg | 60 | | 74 | | 105 |
| | Sound Power level*1 | dB(A) | 64 | | 64.5 | | 71 |
| | Sound Power level(Silent mode)*1 | dB(A) | 61 | | 62 | | 68 |
| | Sound Pressure level*2 | dB(A) | 48 | | 50 | | 54 |
| | Sound Pressure level(Silent mode)*2 | dB(A) | 45 | | 47 | | 51 |
| | Airflow | $m^3$/min | 50 | | 73 | | 100 |
| | Drain pan heater | W | 100 | | 120 | | 120 |
| | Type of compressor | | Rotary | | | | |
| | Ref control | | EEV | | | | |
| | Refrigerant volume (pipe length without additional charge) | kg (m) | 2.55 (15) | | 2.9 (15) | | 4.0 (15) |
| | Dimensions, refrigerant pipe | mm(inches) | Gas pipe : OD 15.88 (5/8"), Liquid pipe : OD 9.52 (3/8") | | | | |
| | Ref pipe connections | | Flare | | | | |

Number in the end of model name in indoor unit (e.g. HMA100V1 or V2) shows available languaaes in the software.
1 : English, French, Italian, German, Czech, Swedish, Danish, Norwegian, Finnish, Dutch
2 : English, Latvian, Estonian, Lithuanian, Polish, Spanish, Portuguese, Turkish, Hungarian, Slovenian

## Tank Unit (for HMS140V1/HMS140V2 only)

| Model | | | HT30 | MT300 | MT500 |
|---|---|---|---|---|---|
| Power source | | | 1 phase 230V / 3 phase 400V 50Hz | | |
| Volume | | liter | 30 | 300 | 480 |
| Volume hot water coil | | liter | – | 14 | 21 |
| Tapping capacity | 12liter/min | liter | – | 320 | 960 |
| | 16liter/min | liter | – | 230 | 560 |
| Immersion heater | | kW | 9kW 4steps | | |
| Height | | mm | 360 | 1880 (+20~45mm) | 1695 (+20~55mm) |
| Width | | mm | 590 | 600 | 760 |
| Depth | | mm | 360 | 600 | 876 |
| Weight | | kg | 24 | 110 | 130 |
| Dimensions, climate system pipe | | mm(inch) | 28 | | |
| Dimensions, hot water pipe | | mm(inch) | 28 | | |

## Test conditions

| | | Water Temperature | Ambient Temperature |
|---|---|---|---|
| Heating | condition 1 | 45°C out / 40°C in | 7°C DB / 6°C WB |
| | condition 2 | 35°C out / 30°C in | |
| Cooling | condition 1 | 7°C out / 12°C in | 35°C DB |
| | condition 2 | 18°C out / 23°C in | |
| Tapping | | 40°C out / 15°C in | 7°C DB / 6°C WB |

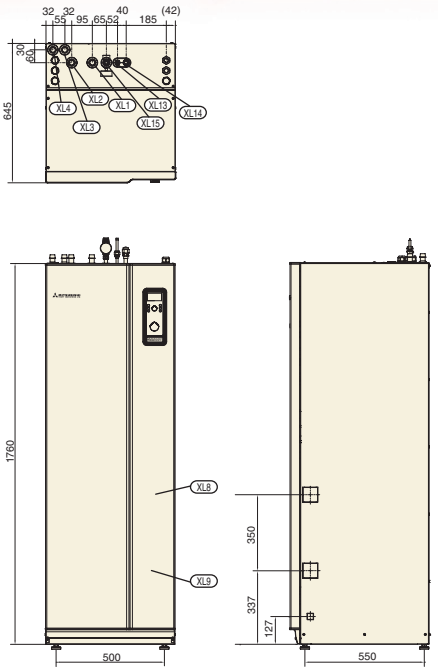
*1 : Test condition for sound power level
Temperature condition : Heating condition 2

*2 : Test condition for sound pressure level
Temperature condition : Heating condition 2
MIC position : 1m away in front of outdoor unit at the height of 1m

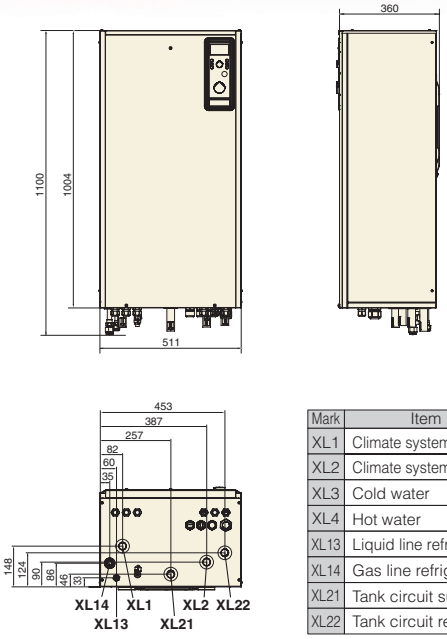
# Dimensions

## Indoor unit

### 3HP, 3.5HP



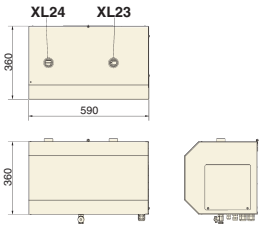

### 6HP



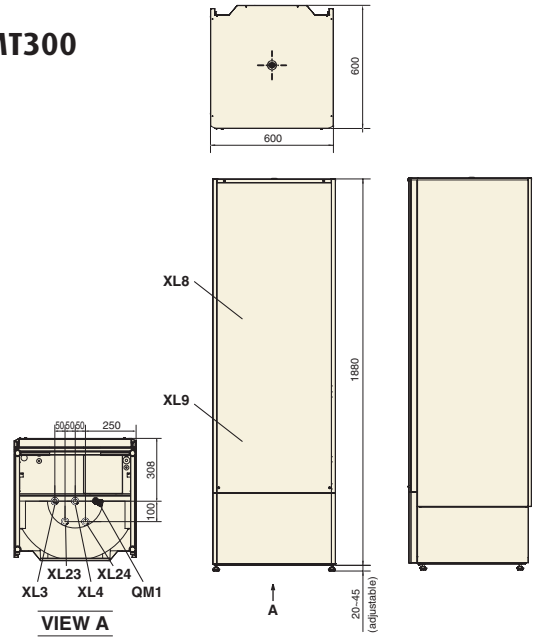

| Mark | Item | 3HP/3.5HP | 6HP |
|---|---|---|---|
| XL1 | Climate system supply | 22mm | 28mm |
| XL2 | Climate system return | 22mm | 28mm |
| XL3 | Cold water | 22mm | — |
| XL4 | Hot water | 22mm | — |
| XL13 | Liquid line refrigerant | 3/8" | 3/8" |
| XL14 | Gas line refrigerant | 5/8" | 5/8" |
| XL21 | Tank circuit supply | — | 28mm |
| XL22 | Tank circuit return | — | 28mm |

## Tank for indoor unit (6HP)

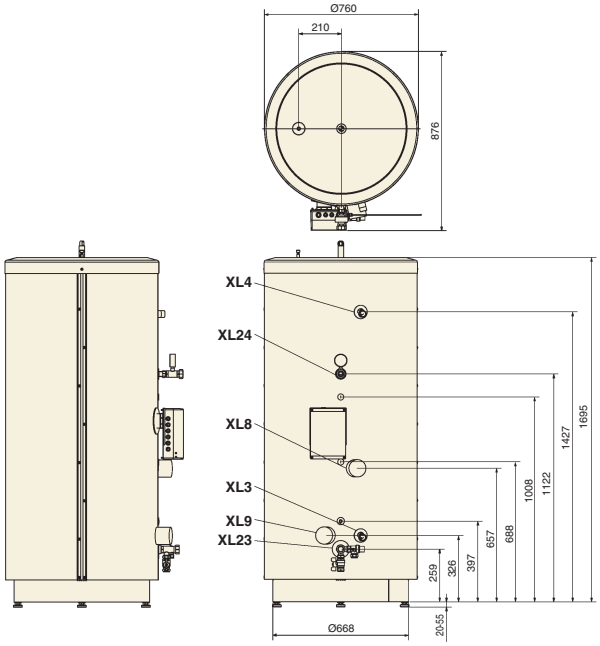
### HT30




### MT300



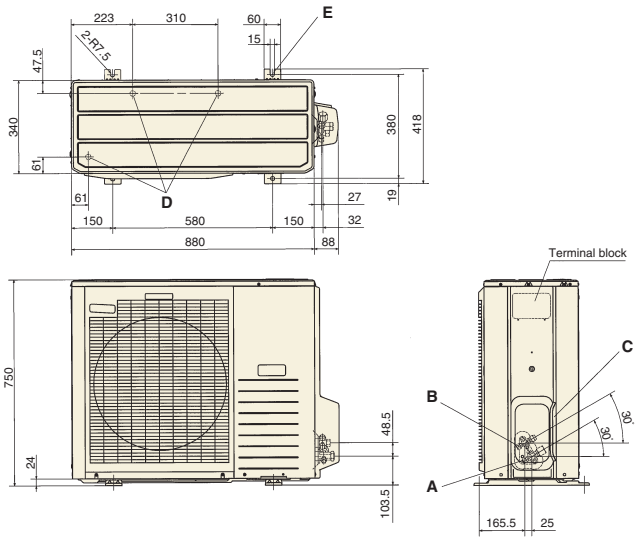

### MT500



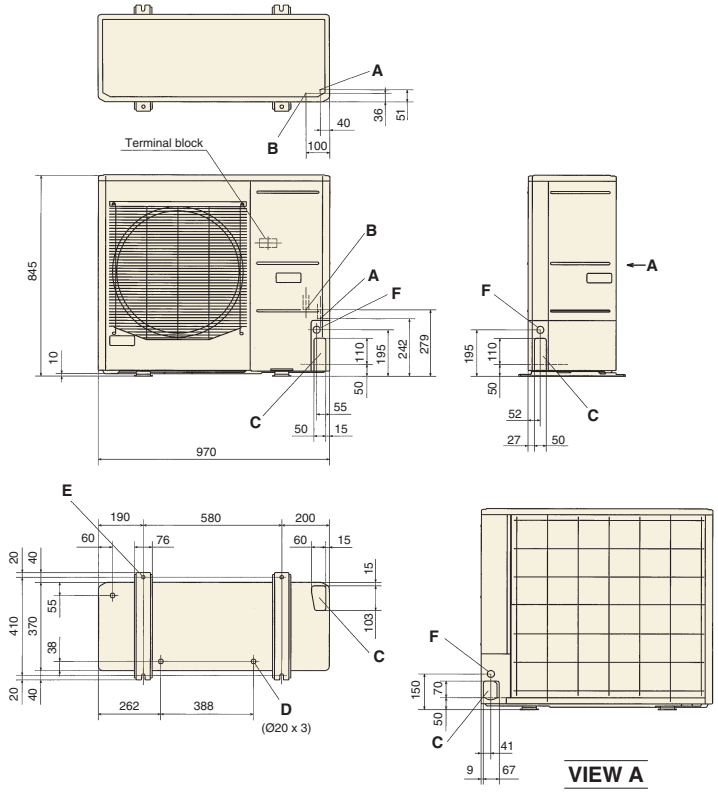

| Mark | Item | HT30 | MT300 | MT500 |
|---|---|---|---|---|
| XL3 | Cold water | — | G1 ext.(1") | G1 ext.(1") |
| XL4 | Hot water | — | G1 ext.(1") | G1 ext.(1") |
| XL8 | External heat source in | — | R1 int | G1 int |
| XL9 | External heat source out | — | R1 int | G1 int |
| XL23 | Circulation supply | G1 ext.(1") | G1 ext.(1") | 28mm |
| XL24 | Circulation return | G1 ext.(1") | G1 ext.(1") | 28mm |

# Outdoor unit

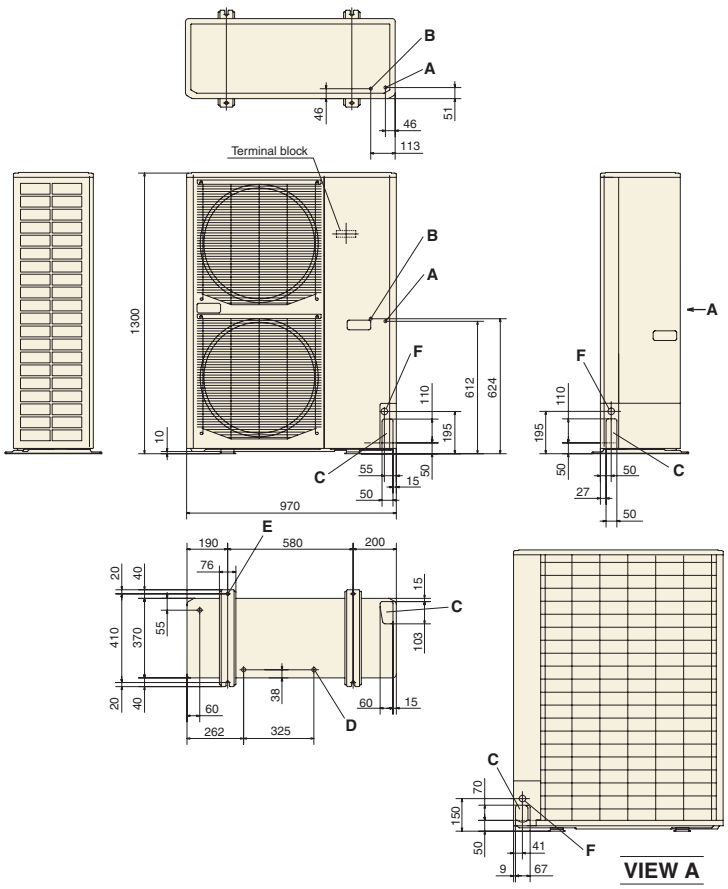
## 3HP




## 3.5HP




## 6HP



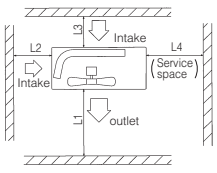

| Mark | Item | 3HP / 3.5HP | 6HP |
|---|---|---|---|
| A | Service valve connection (gas side) | ø15.88(5/8") (Flare) | |
| B | Service valve connection (liquid side) | ø9.52(3/8") (Flare) | |
| C | Pipe/cable draw-out hole | | |
| D | Drain discharge hole | ø20x3places | |
| E | Anchor bolt hole | M10x4places | |
| F | Cable draw-out port | ø30.3x3places | ø30(front)<br>ø45(side)<br>ø50(back) |

Notes:
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.

### Minimum installation space

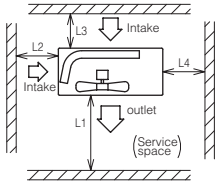
#### 3HP

| Dimensions \ Examples of installation | 1 | 2 | 3 |
|---|---|---|---|
| $L_1$ | Open | Open | 500 |
| $L_2$ | 300 | 250 | Open |
| $L_3$ | 100 | 150 | 100 |
| $L_4$ | 250 | 250 | 250 |



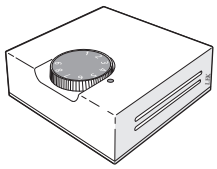

#### 3.5HP/6HP

| Dimensions \ Examples of installation | 1 | 2 | 3 |
|---|---|---|---|
| $L_1$ | Open | Open | 500 |
| $L_2$ | 300 | 5 | Open |
| $L_3$ | 150 | 300 | 150 |
| $L_4$ | 5 | 5 | 5 |



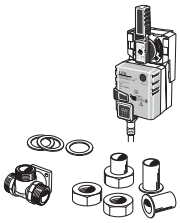
# Accessories

## MH-RG 10



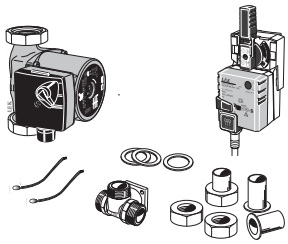
Room sensor
Part No. MCD291A001

## VCC22 for HMA100
## VCC28 for HMS140



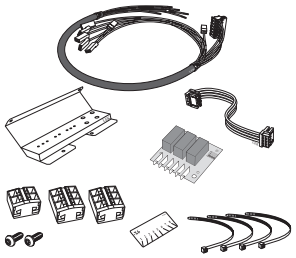
Reversing valve for changing operation of cooling and heating
Part No. MCD291A002(VCC22)
MCD291A005(VCC28)

## ESV22 for HMA100
## ESV28 for HMS140



Extra mixing valve group for adjusting temperature in heating operation
Part No. MCD291A003(ESV22)
MCD291A006(ESV28)

## ACK22 for VCC22/ESV22
## ACK28 for VCC28/ESV28



Cable kit
Part No. MCD291A004(ACK22)
MCD291A007(ACK28)

# Before starting use

### Before use
In order to get the greatest benefit from Our Air to Water Heat Pump, read thoroughly the User's manual.

### Places
Do not install in places where combustible gas could leak or where there are sparks.
Keep away from places where combustible gas could be generated, flow or accumulate, or locations containing carbon fibers otherwise there is a danger of fire.

### Installation
Installation must be carried out in accordance with current norms and directives.
Current regulations require the inspection of installation before commissioning and the inspection must be carried out by suitable qualified personnel and should be documented.
Improper installation will lead to water leakage, electric shocks, fires and other serious problems.
Make sure that the indoor unit and the outdoor unit are stable in installation and fixed on stable base.

MITSUBISHI HEAVY INDUSTRIES, LTD.

Mitsubishi Heavy Industries, Ltd.
Air-Conditioning & Refrigeration Systems Headquarters
16-5, Konan 2-chome, Minato-ku, Tokyo, 108-8215 Japan
**http://www.mhi.co.jp**

**ISO9001**
Our Air Conditioning & Refrigeration Systems Headquarters is an ISO9001 approved factory for residential air conditioners and commercial-use air conditioners (including heat pumps).

BIWAJIMA PLANT
Mitsubishi Heavy Industries, Ltd.
Air-conditioning & Refrigeration Systems Headquarters
Certified ISO 9001
Certificate number : JQA-0709

MITSUBISHI HEAVY INDUSTRIES-MAHAJAK AIR CONDITIONERS CO., LTD.
Certified ISO 9001
Certificate Number : 04100 1998 0813

**ISO14001**
Our Air Conditioning & Refrigeration Systems Headquarters has been assessed and found to comply with the requirements of ISO14001.

BIWAJIMA PLANT
Mitsubishi Heavy Industries, Ltd.
Air-conditioning & Refrigeration Systems Headquarters
Certified ISO 14001
Certificate number : JQA-EM0256

MITSUBISHI HEAVY INDUSTRIES-MAHAJAK AIR CONDITIONERS CO.,LTD.
Certificate Number : 04104 1998 0813 E5

HB91-11HM01E-A-0 July 2011(150)R

Because of our policy of continuous improvement, we reserve right to make changes in all specifications without notice.
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